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## Two New Species of *Simsia* (Asteraceae: Heliantheae) from Southern Mexico

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**ABSTRACT.** Two new species from Mexico are described, *Simsia sylvicola* from Oaxaca and *S. spooneri* from Guerrero. The two species are placed in *Simsia* because they exhibit most of the features that characterize the genus, although they differ in possessing a biconvex achene shape that is more typical of the related genus *Viguiera*. Chromosome counts of  $n = 17$  are reported for both species.

In the course of our revisionary studies of *Viguiera* Kunth ser. *Grammatoglossae* S. F. Blake, we have discovered two previously undescribed species. There is some question whether these should be placed in *Viguiera* or in the related *Simsia* Persoon, because the distinction between these genera is still problematic. In practice, Spooner (1990) considered *Simsia* to be delimited by features of the disk achenes, which are laterally very flattened and usually have a pappus of two awns but typically lack squamellae. In contrast, the typical disk achene in *Viguiera* is biconvex and has a pappus that includes both two awns and also two or more squamellae. There is, however, a larger suite of traits that, together with the achene features, characterize *Simsia* (Spooner, 1990), including nodal disks, herbaceous involucre, long, narrow ray ovaries, long, tapering style branches, and setose anther connectives. Many of these traits are also exhibited in combination by some of the members of *Viguiera* ser. *Grammatoglossae*. The two new species are particularly striking in differing from typical members of *Simsia* only in features of the achene, and thus further bridge the morphological distinction between the two groups. Further support indicating that *Simsia* and some members of *Viguiera* ser. *Grammatoglossae* are related phylogenetically has been revealed from restriction site analysis of chloroplast DNA (Schilling & Jansen, 1989; Schilling & Panero, unpublished data). Resolution of the exact boundaries between *Simsia* and *Viguiera* ser. *Grammatoglossae* will await further information from DNA-based studies. We argue at this point that the concept of *Simsia*

should be broadened relative to that of Spooner (1990) to include some species that have biconvex achenes (there is, in fact, variation within one species of *Simsia*, *S. ghiesbreghtii* (A. Gray) S. F. Blake, for this trait). For this reason, we suggest placement in *Simsia* of the two species newly described here, *S. sylvicola* and *S. spooneri*.

***Simsia sylvicola*** Panero & E. Schilling, sp. nov.

TYPE: Mexico. Oaxaca: Km 65 of the road Oaxaca-Sola de Vega, occasional in pine-oak forest, 1,950 m, 10 Nov. 1990, Panero 2106 (holotype, MEXU; isotypes, ENCB, SI, TENN, TEX, US). Figure 1.

A *Viguiera rhombifolia* (Robinson & Greenman) S. F. Blake foliis perfoliatis et late deltatis et petiolis plerumque non alatis differt.

Perennial herbs 4–10 dm tall, sometimes prostrate. Stems terete, purplish brown, sparsely to moderately puberulent, hispid distally toward the capitulescence. Leaves opposite, triplinerved; petioles 10–23 mm long, terete to slightly canaliculate, sparsely to moderately puberulent to hispid; blades 4–7 cm long, 12–55 mm wide, gradually decreasing in size distally toward the capitulescence, deltate to ovate, base rounded to truncate, apex acuminate, margins serrate to dentate, adaxial surface shiny dark green drying dull brownish green, sparsely to moderately strigose to hirsute, abaxial surface slightly paler in color than adaxial surface, moderately hirsute, pubescence denser on veins outlining them against a green background. Capitulescences dichasial, thyrsoid, open or sometimes heads congested at distal end of peduncles with 3–25+ heads; peduncles 2–30 cm long, pubescence like that of the stem. Heads 6.5–7.5 mm diam. (ligules excluded), 12–13 mm high, campanulate to cylindrical; receptacles 4.5–5.5 mm diam. in fruit, flat to slightly convex. Phyllaries 19–23 in 3 graduated series; phyllaries of first series 3–5.5 mm long, 1.2–1.5 mm wide, ovate to lanceolate, herbaceous, dark

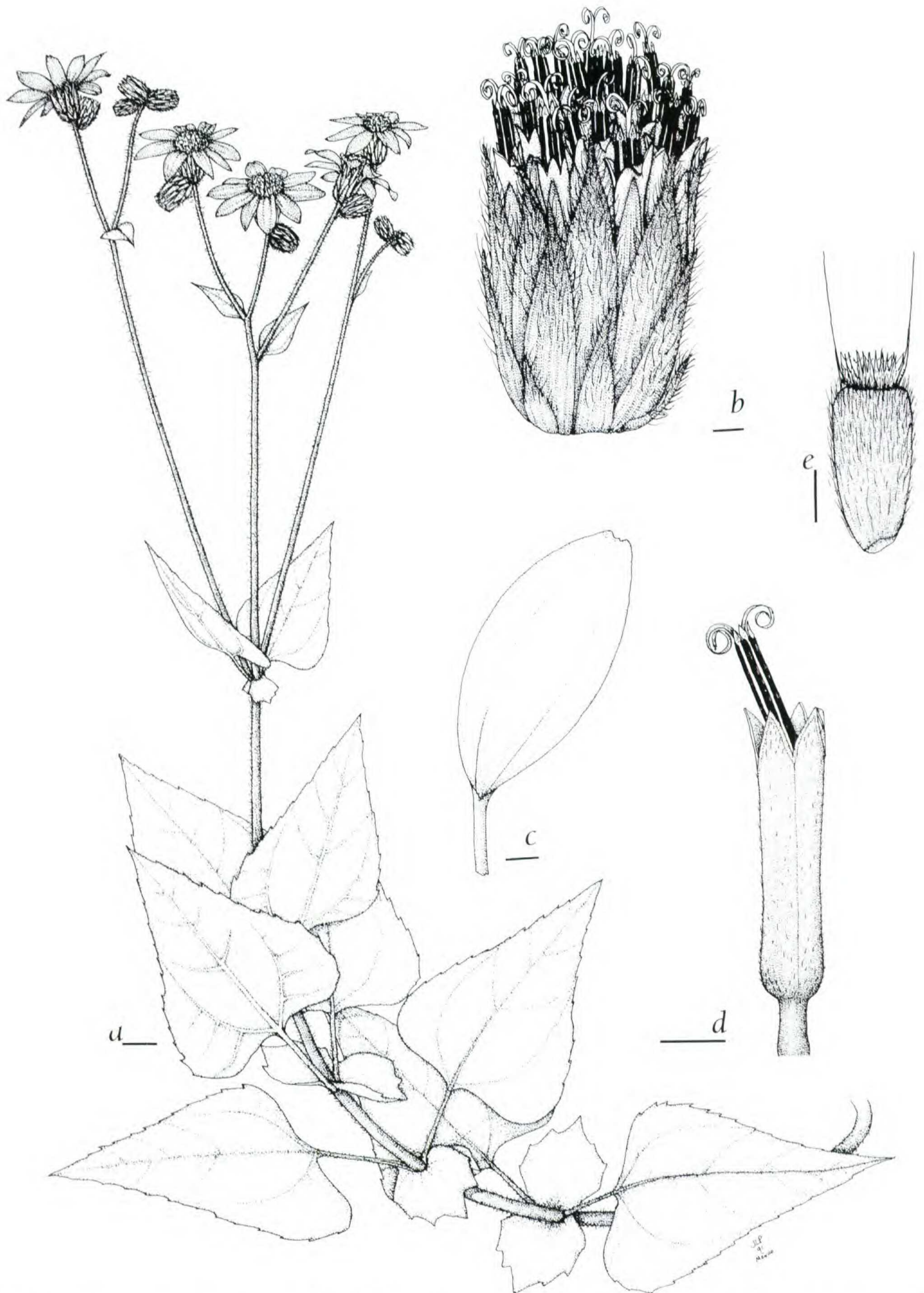


Figure 1. *Simsia sylvicola* Panero & E. Schilling (*Panero 2106*). —a. Habit. —b. Head. —c. Ligule. —d. Disk flower. —e. Achene. Scale bars = 1 cm (a); 1 mm (b-e).

green drying blackish green, sparsely puberulent, hispid distally toward the apex, margins ciliate; phyllaries of second and third series 9–11 mm long, 1.7–2.3 mm wide, lanceolate to narrowly lanceolate,

herbaceous, dark green drying blackish green, pubescence as first series. Pales 7–7.8 mm long, 2.8–3.2 mm wide, lanceolate to ovate in outline, conduplicate, shallowly keeled, not exceeding phyllaries,

chartaceous, stramineous turning hyaline whitish with age, essentially glabrous abaxially, apex acuminate to slightly cuspidate, erect, dark green drying black. Ray flowers 7–11(–13); corollas lemon yellow or pale yellow; tube 1.5–1.7 mm long, essentially glabrous; ligule 6.5–9 mm long, 3.5–4.5 mm wide, oval-oblong to suborbicular, sparsely puberulent, apex rounded and minutely bifid; ovaries 5–5.5 mm long, linear, triquetrous, glabrous, pappus of 2–3 minute scales. Disk flowers 25–35, flowers protruding 2–3 mm beyond pales; corollas lemon yellow or greenish yellow turning purplish with age, cylindrical; tube 0.6–0.8 mm long, glabrous or minutely puberulent; throat 4 mm long, 1 mm wide, veins pale orange and discernible the entire length of the throat, glabrous or sparsely puberulent; lobes 0.5 mm long, sparsely puberulent; anthers 2.5 mm long, thecae black; styles 6.5 mm long; style branches 1.8–2.2 mm long. Achenes 3.5–3.7 mm long, 1.5 mm wide, biconvex, oval-obovate, sometimes edged with a minute flat rim, shiny black or mottled, sparsely sericeous, pappus of 2 awns and 0–2 squamellae, awns slender, stramineous, subequal, 1.5–2 mm long, squamellae 0.5 mm long. Chromosome number:  $n = 17$ .

*Paratypes.* MEXICO. OAXACA: 15.1 km N of Sola de Vega on road to Oaxaca, 1,800 m, 21 Oct. 1985, *Bartholomew et al.* 3251 (CAS, TENN); ca. 10–15 km N Sola de Vega, road to Oaxaca, 1,880 m, 17 Sep. 1988 (in bud), *Schilling & Panero* 88-35 (MEXU, TENN; voucher for chromosome count of  $n = 17$ ).

*Simsia sylvicola* shares a similar habit and floral morphology with *Viguiera rhombifolia*, but the two species can be separated by vegetative characteristics. *Simsia sylvicola* has petiolate leaves with perfoliate bases, whereas *V. rhombifolia* has leaves that appear to be sessile because of the completely winged petioles but are not perfoliate.

The species epithet refers to the characteristic occurrence of the species in open oak-pine woods.

***Simsia spooneri* Panero & E. Schilling, sp. nov.**

TYPE: Mexico. Guerrero: 14 km E of Ayotzinapa, ca. km 30 on the road Chilpancingo–Chilapa, 1,900 m, 7 Nov. 1990, *Panero* 2032 (holotype, MEXU; isotypes, ENCB, SI, TENN, TEX, US).

A *Viguiera rhombifolia* (Robinson & Greenman) S. F. Blake foliis magnis et late deltatis cum petiolis non alatis, et *Simsia sylvicola* Panero & E. Schilling foliis non perfoliatis differt.

Perennial herbs 4–15 dm tall. Stems terete, purplish brown, sparsely to moderately puberulent to strigose and scabrous, hispid distally toward the cap-

itulescence. Leaves opposite, triplinerved; petioles 7–15 mm long, terete to slightly canaliculate, sparsely puberulent; blades 4–9 cm long, 17–65 mm wide, gradually decreasing in size distally toward the capitulescence, deltate to ovate, base truncate to rounded, apex acuminate to rounded, margins serrate, adaxial surface shiny green drying dull green, sparsely to moderately strigose to hirsute, abaxial surface slightly paler in color than adaxial surface, sparsely hirsute, veins raised and clearly outlined against background, essentially glabrous. Capitulescences dichasial, thyrsoid, open or sometimes heads congested at distal end of peduncles with 3–25+ heads; peduncles 0.5–35 cm long, pubescence like that of the stem. Heads 9–11 mm diam. (ligules excluded), 12–13 mm high, campanulate to cylindrical; receptacles 0.6–0.7 mm diam. in fruit, flat to slightly convex. Phyllaries 16–20 in 2–3 graduated series; phyllaries of first series 2.5–5.5 mm long, 1.5–2.2 mm wide, ovate, herbaceous, dark green drying blackish green, moderately puberulent, margins ciliate; phyllaries of second and third series 8–13 mm long, 2.2–2.7 mm wide, lanceolate to narrowly oblong, herbaceous, dark green drying blackish green, sparsely puberulent especially along mid costae. Pales 9 mm long, 2.5 mm wide, lanceolate to ovate in outline, conduplicate, shallowly keeled, not exceeding phyllaries, chartaceous, stramineous turning hyaline whitish with age, essentially glabrous abaxially, apex acuminate to slightly cuspidate, erect, dark green drying black. Ray flowers 9–13(–15); corollas lemon yellow or pale yellow; tube 1.5 mm long, essentially glabrous; ligule 11–13 mm long, 5–5.5 mm wide, oval oblong to ovate, essentially glabrous, apex acuminate to rounded and minutely bifid; ovaries 5.5 mm long, linear, triquetrous, glabrous, pappus of 2–3 minute scales. Disk flowers 15–30, flowers protruding 2–3 mm beyond pales; corollas lemon yellow or greenish yellow turning deep purple with age, cylindrical; tube 0.6–0.8 mm long, glabrous or minutely puberulent; throat 5.8–6.2 mm long, 1.3–1.6 mm wide, veins pale orange and discernible the entire length of the throat, glabrous or sparsely puberulent; lobes 1 mm long, sparsely puberulent; anthers 3 mm long, thecae black; styles 7–7.5 mm long; style branches 1.8–2.2 mm long. Achenes 3.4–4.2 mm long, 1.4–2 mm wide, biconvex, oblong to obovate, shiny black or mottled, moderately sericeous, pappus of 2 awns and 5–7 squamellae, awns slender, stramineous, subequal, 2.7–3.2 mm long, squamellae 0.5–0.7 mm long. Chromosome number:  $n = 17$ .

*Paratypes.* MEXICO. GUERRERO: 9 mi. E of Ayotzinapa, 13 Oct. 1984, *Spooner & Burgos* 2610 (OS, TENN);

road to Chichihualco ca. 20 km W from jct. with Hwy. 95, 1,600 m, 19 Sep. 1988 (in bud), *Schilling & Panero 88-43* (TENN; voucher for chromosome count of  $n = 17$ ); Km 20 on the road Chilpancingo–Chichihualco, 1,900 m, 16 Nov. 1990, *Panero 2027* (COL, K, MA, MEXU, TENN, UC, US).

The species epithet honors David M. Spooner, potato specialist at the University of Wisconsin and monographer of *Simsia*, as well as first collector of this taxon.

*Simsia spooneri* closely resembles *S. sylvicola*, but plants of the two species have a clearly different aspect when grown together in the University of Tennessee greenhouse. *Simsia spooneri* also resembles *S. villasenorii* Spooner in its habit and general morphology. Both species tend to grow on vertical, eroded hillsides where they produce a multitude of flowering shoots of various lengths arising from a central mass of tuberous roots. The two species can be separated by their involucre and disk

achene morphologies: *S. spooneri* has a campanulate, green involucre and achenes without flat rims, whereas *S. villasenorii* has an imbricate, purplish urceolate involucre and achenes with a flat rim. *Simsia spooneri* can be confused with *Viguiera rhombifolia*, because they have similar head and achene morphologies, but they differ in leaf and habit characteristics.

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